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RECENT MOUNTS OF FOSSIL REPTILES AND AMPHIBIANS IN THE MUSEUM OF COMPARATIVE ZOÖLOGY

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With Two Plates

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No. 5 — *Recent Mounts of Fossil Reptiles and Amphibians in the Museum of Comparative Zoölogy*

By Alfred Sherwood Romer

During the past decade a considerable portion of the paleontological work of the Museum of Comparative Zoölogy has been devoted to the collection, preparation and study of reptiles and amphibians from the older geological periods, principally from the Permo-Carboniferous redbeds of the American Southwest. Correlated with this work has been the execution by Mr. George Nelson, Chief Preparator, of a series of panel mounts of articulated skeletons, which are highly noteworthy from both technical and artistic points of view. These mounts are figured and described briefly here. The collectors of the various specimens are noted below. Most of the preparation was done by Mr. R. V. Witter, Assistant Preparator, 1935–42; the dicynodont skeleton was prepared by Mr. Russell Olsen. The field work involved was supported in most cases by funds from the Milton fund of Harvard University, from Thomas Barbour, and from the Department of Biology.

Ophiacodon uniformis

Plate 1, Fig. 1

A primitive Texas pelycosaur of modest size; usually known as "*Poliosaurus*" but referable to the genus *Ophiacodon* and very similar to *O. mirus* from the redbeds of New Mexico. This skeleton (No. 1366) is the only one of any degree of completeness known and is used as a basis for description of the species in the recent "Review of the Pelycosauria" by Romer and Price (1940, pp. 238–242, etc.), and for the general account of the *Ophiacodon* skull in the same work (pp. 201–205, 226–229, pls. 1–4). The length of the skeleton as mounted is approximately five and a half feet. The specimen (as well as that of *Dimetrodon milleri*, described below) was obtained in 1936 by a party under the direction of R. V. Witter from a newly discovered bonebed situated one mile southwest of Archer City, Texas, in the Putnam Formation of the Wichita Group.

The discovery of the Archer City bonebed has proved to be an event of considerable interest in the study of stratigraphic distribution of Texas redbeds vertebrates. Most well-known forms have been found in two horizons: (1) the lower portion of the Arroyo Formation of the

Clear Fork Group, and (2) a somewhat lower set of localities in the upper part of the Wichita Group (Belle Plains Formation and the uppermost part of the Admiral formation). Work in recent years had shown that the vertebrate fauna was present at much lower levels, but remains were fragmentary. The Archer City locality gives us a third horizon, well down in the Wichita, with articulated material representing a number of representative genera. It is to be hoped that some similar find in the future will give us comparable data for the Moran and Pueblo Formations still lower in the stratigraphic sequence.

DIMETRODON LIMBATUS

Plate 1, Fig. 2

The skeleton of this characteristic Wichita species of long-spined pelycosaur is nearly complete except for portions of the feet and tail. This individual formed the basis for most of the figures and descriptions of the *Dimetrodon* skeleton in the "Review of the Pelycosauria." (pls. 6–16, 23–25, 27–29, 31).

The specimen, No. 1347, was collected by A. S. Romer from the east (or south) side of Godwin Creek at a horizon close to the boundary between Admiral and Belle Plains Formations of the Wichita Group. As mounted the skeleton is seven feet in length; the tail, however, is incomplete, and comparison with *Dimetrodon milleri* indicates that the actual length was a foot greater. Size and dental characters suggest that our specimen was a female; the rather larger individual from the same locality mounted in the American Museum of Natural History (Case, 1910, pl. 19) is presumably a male, as is a mounted skeleton in Walker Museum of the University of Chicago (Baur and Case, 1899, etc.). A mounted skeleton in the University of Michigan (Case, 1915) is a composite, but most of the material is of the presumed female size.

Apart from the specimens of *D. limbatus* listed above, mounted specimens of *Dimetrodon* are few in number. *D. grandis*, the giant of the genus is mounted in the National Museum (Gilmore, 1919). Walker Museum possesses a specimen of *D. loomisi* with a splendidly preserved series of spines (Romer, 1927), and a composite skeleton in Tübingen (von Huene, 1919, pp. 177–181, pl. 6) is apparently of this species. Apart from the specimen of *D. milleri* noted below the other species of *Dimetrodon* are not as yet known from material adequate for purposes of mounting.

DIMETRODON MILLERI

Plate 1, Fig. 3

The type and only known skeleton of an unusually small and primitive species of *Dimetrodon.* The specimen (No. 1365) is one of the most completely preserved of any Texas reptile, exhibiting, except for some spine fragments, every detail of its anatomy to the tip of toes and tail. The slender tail includes 62 vertebrae, proving conclusively that *Dimetrodon* was a very long-tailed form. The skeleton was obtained from the Archer City bonebed mentioned above. Lying between the ribs, in the proper position for the stomach were bones of the amphibian *Zatrachys*, presumably its last meal.

It is obvious from simple inspection that the spines of this relatively small and early *Dimetrodon* are proportionately shorter than in *D. limbatus.* A similar relation between size and spine length is found in all species of *Dimetrodon* for which we have adequate material, and the genus thus affords an excellent example of heterogonic growth. A mathematical treatment of the data indicates that with increase of size of species in successively later geologic levels, the spine length increases at a rate nearly twice that of the other linear measurements.

EDAPHOSAURUS BOANERGES

Plate 2, Fig. 1

E. boanerges is a member of the "ship-lizard" group of pelycosaurs, usually referred to under the very appropriate but unfortunately incorrect generic designation of *Naosaurus.* The specimen (No. 1531) is a composite but includes the holotypic material of the species. As mounted it is approximately eight feet in length. It was obtained from the Geraldine bonebed in the lower portion of the Admiral Formation in Archer Co., Texas.

The complete backbone as mounted shows 27 presacral vertebrae; this was thought to be the proper number at the time the mount was made (cf. Romer and Price, pp. 382, 392), but further material from Geraldine indicates that 23 was the proper number. In addition new material shows that the tail is inaccurate in some respects. (cf Shuler and Witter, 1942).

The Geraldine bonebed (Romer and Price, pp. 175, 176; Shuler and Witter, 1942) from which the present skeleton was obtained, is a deposit of unusual interest which is rivalled, among Texas localities, only by the Craddock and Briar Creek bonebeds. It was discovered by the writer in 1932 and worked by groups from Harvard University on a number of subsequent occasions. The matrix is for the most part a gray clay, apparently with a large percentage of its contents of organic derivation, containing many carbonized logs and yielding numerous plant impressions. These show that the florule consisted of lush plants with luxuriant growth, in contrast to the xerophytic types composing the typical redbeds flora. The Geraldine deposit, it seems, was formed in a bog in which a host of reptiles and amphibians became mired and died. *Edaphosaurus,* presumably a feeder on plant materials of the type found here, is the most abundant reptile occurring in the deposit. More than a dozen articulated individuals have been found, in addition to numerous fragmentary remains. The amphibians *Eryops* and *Cricotus* are fairly common; a tiny *Dimetrodon* is known from scattered remains. There are almost no traces of other genera.

In addition to the Harvard mount, skeletons of *Edaphosaurus* from Geraldine are mounted at the University of Oklahoma, Amherst College, and Southern Methodist University; it is probable that further mounts from this locality will be made at Yale, Pittsburgh, the U. S. National Museum and possibly other institutions. Three other mounted *Edaphosaurus* skeletons are in existence. Specimens at the University of Chicago (Williston, 1916, figs. 80, 81; 1918, pp. 96, 101–103, figs. 8, 14a–b) and the University of Michigan (Case, 1918) are from the Briar Creek bonebed in the upper part of the Admiral Formation; a mounted skeleton of the large *E. pogonias* from the Clear Fork Group is in the American Museum of Natural History (Osborn, 1907; Case, 1907, p. 138, fig. 62). The last, as originally mounted, was a composite including a *Dimetrodon* skull and *Dimetrodon* limb bones.

Specific determinations of *Edaphosaurus* specimens found in Texas have proved difficult. *E. boanerges* is the geologically oldest and smallest of adequately known forms. Somewhat higher in the series, there are remains from the upper part of the Admiral Formation and the Belle Plains Formation. These specimens have usually been assigned to *E. cruciger.* However most appear to be closer to *E. boanerges,* although a bit larger, and possibly sub-specifically or specifically distinct. *E. cruciger* in a proper sense appears to be characteristic of the Clyde Formation (possibly the highest levels of the Belle Plains). This form is poorly known, and best represented by a vertebral column in the American Museum (Case, 1907, pl. 32, etc.) and an undescribed partial skeleton in this museum. The final phyletic stage is *E. pogonias* of the Clear Fork, with which "*Naosaurus*" *claviger* appears to be synonymous.

ERYOPS MEGACEPHALUS

Plate 2, Fig. 2

Although fragmentary remains of this large Permo-Carboniferous amphibian are among the commonest of fossils in the Texas redbeds, articulated skeletons are rare. The present specimen is the most perfect yet discovered. It includes a nearly complete tail; an American Museum mount (Miner, 1925, p. 154, etc.) which most nearly approaches it in completeness contains only the proximal members of the caudal series. The skeleton (No. 1539) is about five and a half feet long as mounted. It was collected by L. I. Price in 1937 from the Belle Plains Formation of the Wichita Group, north of the Little Wichita River near the eastern line of Baylor County, Texas. The expedition was supported by the Marsh Fund of the National Academy of Sciences. A description of the skin impressions has already been published (Romer and Witter, 1941); its skeleton forms the basis for a general account of the osteology of *Eryops* now in preparation.

Two other skeletons of *Eryops* are on exhibition. One in the American Museum, noted above, was collected by Case from the upper part of the Admiral formation. The second, at the University of Chicago, was collected by the writer in the Clyde Formation near Electra; it is unusually well preserved as far back as the lumbar region, but the hind legs and tail are composite and restored. A third mount of *Eryops* to be exhibited in the Peabody Museum of Yale University, is in preparation.

As is customary, we have referred our specimen to *E. megacephalus*, the genotype. It is highly probable that, as is definitely known to be the case in a number of other genera, the Texas sequence contains several species of this genus. Sawin, as a result of his cranial studies (1941), believes that the cranial material indicates the presence of at least two species, and the postcranial material studied by the writer shows a considerable amount of variation.

DINODONTOSAURUS OLIVEIRAI gen. et spec. nov.

Plate 2, Fig. 3

This large dicynodont is the first skeleton mounted from the series of skeletons obtained from the Triassic of southern Brazil by L. I. Price and Dr. T. E. White in 1936–37 during the course of an expedition supported by a grant from the Milton Fund of Harvard University (cf. Annual Reports of the Museum of Comparative Zoölogy for 1935–36, 1936–37). Previous work in these beds by von Huene had resulted in the discovery of numerous rhynchosaurs and some cynodonts, but of dicynodonts he found little apart from the single form *Stahleckeria*. Price and White, on the contrary, obtained a large and varied suite of dicynodonts. The specimen mounted (No. 1670) is now designated the holotype of one of the larger forms. It was found at Rio do Rasto, 16 km. south of Candelaria, State of Rio Grande do Sul. A brief diagnosis will be given here; a more adequate description will be published at some later time. *Dinodontosaurus* may be defined as a genus of dicynodont therapsids in which maxillary tusks are present, in one sex at least, but other teeth are entirely lost; skull relatively long and narrow, the width being about two-thirds the length; the elongation is mainly in the facial region, the orbits being situated about two-thirds back along the length of the skull. The skull table is much compressed, the two post-orbital crests approaching one another closely above the parietal. The transverse occipital crest tilts backward dorsally, so that the occipital surface is not seen from above. Nasal rugosities are absent. From *Kannemeyeria* of the South African Triassic, *Dinodontosaurus* is readily distinguished by the relatively slight development of the "sagittal crest," so that the skull roof has a straight dorsal margin as seen in side view rather than the marked convexity of *Kannemeyeria*. Since the genus is monotypic, we shall provisionally characterize the species, *D. oliveirai*, on the basis of size alone. The skull length is 364 mm., the length of the presacral column 98 cm.; the total length as restored approximately 180 cm. (6 feet). The specific name is in honor of Dr. Euzebio de Oliveira, former director of the Brazilian Geological Survey and one of many Brazilian friends who gave invaluable aid to the Brazilian collecting party.

BIBLIOGRAPHY

BAUR, G., and CASE, E. C.

1899. "The History of the Pelycosauria, with a Description of the Genus *Dimetrodon*." Amer. Philos. Soc., Tr. 2d. ser., **20**, pp. 1–58.

CASE, E. C.

1907. "Revision of the Pelycosauria of North America." Carnegie Inst. Washington, Publ. No. 55, p. 176.

1910. "Description of a Skeleton of *Dimetrodon incisivus* Cope." Bull. Amer. Mus. Nat. Hist., **28**, art. XIX, pp. 189–196, pls. XV-XIX.

1915. "A Mounted Specimen of *Dimetrodon incisivus* Cope, in the University of Michigan." Amer. Jour. Sci., 4th. ser., **40**, pp. 474–478.

1918. "A Mounted Skeleton of *Edaphosaurus cruciger* Cope, in the geological collection of the University of Michigan." Mus. Zool. Univ. Mich., Occ. Papers, No. 62, pp. 1–6.

GILMORE, C. W.

1919. "A Mounted Skeleton of *Dimetrodon gigas* in the United States National Museum with Notes on the Skeletal Anatomy." U. S. Nat. Mus., Pr., **56**, pp. 525–539.

HUENE, F. VON

1919. "Bilder aus der Paläontologischen Universitätssammlung in Tübingen." Ver. f. vaterl. Naturk. in Wurttemberg Jahresh. **75**, pp. 177–184.

MINER, R. W.

1925. "The Pectoral Limb of *Eryops* and other Primitive Tetrapods." Bull. Amer. Mus. Nat. Hist., **51**, art. VII, pp. 145–312.

OSBORN, H. F.

1907. "A Mounted Skeleton of *Naosaurus*, a Pelycosaur from the Permian of Texas." Bull. Amer. Mus. Nat. Hist., **23**, pp. 265–270.

ROMER, A. S.

1927. "Notes on the Permo-Carboniferous Reptile *Dimetrodon*." Jour. Geol. **35**, No. 8, pp. 673–689.

and PRICE, L. I.

1940. "Review of the Pelycosauria." Geol. Soc. Amer., Special Papers, No. 28, pp. 1–538.

and WITTER, R. V.

1941. "The skin of the Rhachitomous Amphibian *Eryops*." Amer. Jour. Sci., **239**, pp. 822–824.

Sawin, H. J.

1941. "The Cranial Anatomy of *Eryops megacephalus*." Bull. Mus. Comp. Zoöl. **88**, No. 5, pp. 407–463, pls. I-XII.

Shuler, E. W., and Witter, R. V.

1942. "The Mounted Skeleton of *Edaphosaurus boanerges* Romer at Southern Methodist University." Field and Laboratory, **10**, No. 2, pp. 140–144.

Williston, S. W.

1916. "Synopsis of the American Permo-Carboniferous Tetrapoda." Contrib. Walker Mus., **1**, pp. 193–236.

1918. "The Osteology of Some American Permian Vertebrates, III." Contrib. Walker Mus., **2**, pp. 87–112.